REMARKS

The application includes claims 1-13 and 15-26 prior to entering this amendment.

The examiner rejects claims 1-22 under 35 U.S.C. § 103(a) as being unpatentable over Chaddha et al. (U.S. Patent 5,768,535) in view of Fan et al. (US 6,408,005 B1).

The applicant amends claims 1, 4, 13, 15, 16, and 17 and cancels claim 2. The application remains with claims 1, 3-13, and 15-26 after entering this amendment.

The applicants add no new matter and request reconsideration.

Claim Rejections - 35 U.S.C. § 103

The examiner rejects claims 1-22 under 35 U.S.C. § 103(a) as being unpatentable over Chaddha et al. (U.S. Patent 5,768,535) in view of Fan et al. (US 6,408,005 B1). Applicant respectfully traverses the rejections and each of them for the following reasons.

I. Present claims are directed to encoding and scheduling a single video data stream for input to a network/ channel.

The present claims are not directed to the receiving network or channel itself. Fan, et al., by contrast recites, "A Dynamic Rate Control (DRC) scheduler for scheduling cells for service in a generic Asynchronous Transfer Mode (ATM) switch is disclosed."[1] The present claims are directed to processing (encoding and scheduling) a single video input stream. By contrast, the ATM switch of Fan et al. must process multiple users streams: "According to the inventive DRC, each traffic stream associated with an internal switch queue is rate-shaped according to a rate which consists of a minimum guaranteed rate and a dynamic component computed based on congestion information within the switch."[2] Fan, et al. thus address the problem of allocating bandwidth fairly among the multiple input streams – without regard to how each individual stream might have been encoded. According to Fan, et al: "A central problem in allocating the network resources is the manner in which the service to the various users is prioritized. A simple model is to use a First In First Out (FIFO) algorithm. In a simple First-In First-Out (FIFO) scheduler, there is no way of guaranteeing that each stream gets its assigned rate. During some

[1] Fan, et al. U.S. 6,408,005 Abstract.
[2] Fan, et al. U.S. 6,408,005 Abstract (emphasis added).

interval of time, a given stream may transmit at a rate higher…"[3] "While achieving high utilization, DRC guarantees a minimum throughput for each stream and fairly distributes unused bandwidth."[4] See applicant's FIG. 2:

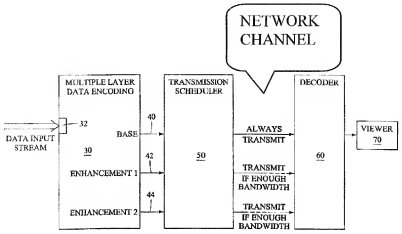


FIG. 2

Fan et al. describe methods and apparatus for use in the "Network channel" shown above, e.g. an ATM switch. More specifically, it manages ATM cell queuing. It handles many different input streams of ATM cells from different users (not shown). "The present invention relates to a control scheduler for an ATM network and, more specifically, to a scheduler which guarantees minimum rate of transmission, while fairly distributes any unused bandwidth."[5]

II. The Examiner's proposed analogy to Fan et al. arises from improper hindsight.

Claim 1 describes a clever method including transmitting an enhancement layer if sufficient bandwidth is available, but then "ceasing the transmitting the enhancement layer responsive to accepting, at an input of a data transmitter, data that has been encoded into a second base layer and a second enhancement layer." That is, enhancement of an image may have to be sacrificed if the data requires transmission of a new image (second base layer) before the enhancement is completely transmitted. (In the preferred embodiment, the enhancement layer was encoded but it, or part of it, is not sent on to the transmission channel.) The Examiner apparently would draw an analogy to Fan et al.'s handling of various competing streams of ATM cells in a transmission channel. The Examiner argues, "Fan teaches a dynamic rate control

[3] Fan, et al. U.S. 6,408,005 at column 1, lines 29-35.
[4] Fan, et al. U.S. 6,408,005 Abstract (emphasis added).
[5] Fan, et al. U.S. 6,408,005 Field of the Invention.

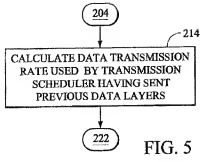


FIG. 5

For at least the foregoing reasons, claim 1 is patentable over the art of record.

Claim 2 is canceled.

Regarding **claim 3**, it calls for measuring data traffic on the transmission channel itself. (For example, through a message or feedback signal to applicant's "scheduler" **50** in FIG. 2.) Measuring traffic queues in a network switch is known in prior art. However, the art cited does not apply this concept to base layer and enhancement layer decision making as is claimed here. The Examiner's proposed analogy shows nothing more than hindsight reconstruction. For example, stopping one stream (or delaying a cell) in the ATM switch would not pertain to how a given stream was constructed ***before it entered the channel***, which is the subject matter here. The method of claim 3 has the advantage of throttling channel loading if necessary before the steam enters the channel. The subject matter of claim 3 would not have been obvious at the time of the invention in view of an objective read of the prior art cited.

Regarding **claim 4**, once again it is patentable at least because it looks ***backward*** in terms of the data already sent into the channel. The language is amended to emphasize this feature, thus it recites: "The method according to claim 1 wherein the data transmitter has a pre-set average target data rate, and wherein determining ~~if there is enough bandwidth available to the data transmitter~~ whether or not to transmit the enhancement layer in addition to the base layer already transmitted comprises determining whether an average bandwidth already used by the data transmitter over a last measuring period is below the pre-set average target data rate.

scheduler, which comprises providing a minimum guaranteed rate (bandwidth available to the data transmitter associated with transmitting the base layer) and a share of the excess bandwidth (enhancement layer)."[6] Applicant respectfully disagrees. This supposed analogy, if there be one, obviously arises solely from hindsight in view of applicant's disclosure.

Fan et al. actually makes NO distinction between base layer and enhancement layer data. Indeed, the ATM cells do not identify which are part of base layer data and which contain enhancement layer data. Fan et al. is allocating bandwidth among competing streams in the transmission channel. It may consider QoS requirements, but not on the basis disclosed in the present application. Second, Fan et al. is dealing with parallel streams, in the sense that all of them are injected into the network. It is ordering or sequencing the cells from different streams. Claim 1 is instead directed to a ***single stream***, and more specifically to constructing the content of that stream ***before*** it enters the transmission channel. The claim as amended is directed to "A method for ~~transmitting~~ constructing a single stream of video data for transmission over a transmission channel."

The Examiner further contends "The scheduler first services the minimum rate and then may or may not distribute the unused bandwidth (transmitting the enhancement layer if there is enough bandwidth available to transmit the enhancement layer responsive to determining the bandwidth associated with transmitting the base layer)."[7] This again is improperly strained logic. The claim refers to making the decision whether or not to send the enhancement layer, "based on the recorded indicia of transmitting the base layer." This method looks backward; the base layer is already gone in accordance with the method of claim 1. It calls for keeping track of what was already sent: "recording indicia of the transmission of the base layer." In the specification see, for example, see **FIG. 4**, "Record Base Layer Transmittal Data" **208**; "Determine Average Bandwidth of Layers Already Transmitted" **220**, etc. (A similar feature was described in claim 2, now canceled.) Fat et al., by contrast, looks to *current* excess bandwidth, not to what has already transpired. This feature appears again in applicant's FIG. 5:

[6] Official action, paragraph bridging pages 3-4.
[7] Official action, paragraph bridging pages 3-4.

Claims 5-7 are not argued as being independently patentable apart from the corresponding base claim.

Claims 9-11 are not argued as being independently patentable apart from claim 1.

Independent **Claim 13** is directed to a multi-layer data transmission system, comprising: "a transmission scheduler having a first data input configured to accept an encoded base layer of data and an enhancement layer of data, and the transmission scheduler having an output terminal for providing selected data into a transmission channel; and a scheduling operation controlling the transmission scheduler ..." This system controls sending data into a transmission channel. It does not describe managing multiple streams in the channel (or switch) as suggested by the Examiner's application of the prior art. **Claim 14** was previously canceled. **Claims 15-16** are currently amended to depend from claim 13. They too should be allowed.

The Examiner's Specific Response to Previous Arguments

The Examiner argues that he, "equates the adjusting of the minimum guaranteed rate to accommodate a new stream of Fan, which could effectively terminate the transmission of the excess bandwidth in order to transmit the new stream ... Therefore, the Examiner contends, "Fan teaches ceasing the transmitting the enhancement layer responsive to accepting data that has been encoded into a second base layer..."[8] Applicant strenuously disagrees. Fan may adjust guaranteed rates, but that is in response to the depth of the input queues; it is part of sharing bandwidth in a rational manner across competing users. Referring to the very text cited by the Examiner, Fan et al. explains: "The DRC scheduler paces the cells of each stream queue such that the spacing between cells belonging to the same stream is no smaller than the reciprocal of the minimum rate."[9] The present claims, as noted above, describe methods for forming a single stream before it enters the network. The decision-making determines the content of that stream of data –is it base layer; does it then comprise enhancement layer; is the enhancement data truncated to begin a new base layer? This approach is not described by the combination proposed by the examiner. The Examiner "equates" apples and oranges, and reconsideration is in order.

[8] Office action at page 10, section 4.

The System of Claim 17

The system of **claim 17** is not a part of the network or transmission channel; rather, it is arranged expressly for encoding and scheduling data for input to a network or channel. The claim language is amended to emphasize that the claimed apparatus is used in front of a transmission channel; it is not *in* the channel. And, it handles only a single stream of data, contrary to the ATM switch disclosed in Fan et al.

"17. (Currently amended) A data transmission system for outputting a single coded video stream into a transmission channel, comprising:

an encoder having an input for receiving a single data stream and configured to encode the data stream into a base layer and at least one enhancement layer;

a transmission scheduler coupled to the encoder and having an input terminal to accept the encoded layers of data, ***and having an output terminal coupled to a transmission channel***; and

a scheduling operation running on the transmission scheduler, configured to signal the transmission scheduler to send the base layer of data from the output terminal of the transmission scheduler into the transmission channel after it is received, configured to signal the transmission scheduler to send the at least one enhancement layer into the transmission channel responsive to determining the bandwidth already used by the transmission scheduler sending the base layer, and configured to cease sending the at least one enhancement layer into the transmission channel responsive to accepting a new encoded layers of data at the input terminal of the transmission scheduler;

wherein the scheduling operation maintains an average target bandwidth."

Fan et al. allocates bandwidth in various ways across multiple input streams, all entering the channel at substantially the same time. Claim 17 is a system for controlling a single stream bandwidth requirement before it is injected into the transmission channel. For at least these reasons, claim 17 is patentable over the prior art of record.

As to **claim 18**, the scheduling operation is determining whether there is enough bandwidth available to the transmission scheduler to send a first of the enhancement layers. Fan et al. does not distinguish between *enhancement layers* and *base layers*. In the context of the

[9] Fan, et al. U.S. 6,408,005 at column 8, lines 25-28.

channel/ ATM switch, it is all indistinguishable "cells." More importantly, Fan et al. is concerned with transmission of multiple competing user traffic streams over the same channel. As the Examiner pointed out, in Fan:

> "The DRC scheduler paces the cells of each stream queue such that the spacing between cells belonging to the same stream is no smaller than the reciprocal of the minimum rate. If the connection admission control determines a certain minimum bandwidth requirement for a stream to meet a given QoS, the DRC scheduler should be able to deliver the required QoS by virtue Of its ability to guarantee this minimum rate. Moreover, the DRC scheduler distributes unused bandwidth in a fair manner among the competing traffic streams."[10]

As to **claim 19**, it depends from claim 18, but is not argued as being independently patentable.

As to **claim 20**, it throttles the scheduler based on whether an instantaneous bandwidth rate on the transmission channel is below a predetermined rate. Again, the context is a scheduling operation for determining whether there is enough bandwidth available to the transmission scheduler to send a first of the enhancement layers into the transmission channel. As noted, Fan et al. does not distinguish between *enhancement layers* and *base layers*. Accordingly, this claim also should be allowed.

Claims 21 and 22 are patentable for similar reasons; they too describe scheduling operations for managing video base layers and enhancement layers of data before they even enter the transmission channel (which, in turn, may be an ATM channel as described by Fan et al.)

Claims 23-26 were withdrawn from consideration by the examiner as being independent or distinct from the invention originally claimed. Applicant respectfully disagrees and requests reconsideration and allowance of these claims. The examiner characterized them as directed to video enhancement. Given that independent claims 1 and 17 are now focused on scheduling video base layer and enhancement data, claims 23-26 fall within substantially the same subject matter. They describe decoding and displaying that same data.

[10] Fan, et al. U.S. 6,408,005 at column 8, lines 25-34.

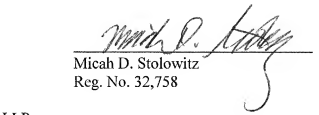
Conclusion

For the foregoing reasons, reconsideration and allowance of claims 1, 3-13, and 15-26 of the application as amended is requested. The Examiner is encouraged to telephone the undersigned at (503) 224-2170 if it appears that an interview would be helpful in advancing the case.

Customer No. 73496

Respectfully submitted,

STOLOWITZ FORD COWGER LLP



Micah D. Stolowitz
Reg. No. 32,758

STOLOWITZ FORD COWGER LLP
621 SW Morrison Street, Suite 600
Portland, OR 97205
(503) 224-2170